

Numbers 33 - 37, 43

a+b.

(33) $s = 2 - 2 \sin t$

a) $v(t) = -2 \cos t \text{ m/sec}$

speed = $|-2 \cos t| \text{ m/sec}$

Acceleration = $2 \sin t \text{ m/sec}^2$

Jerk = $2 \cos t \text{ m/sec}^3$

b) $v(\frac{\pi}{4}) = \cancel{-2 \cos(\frac{\pi}{4})} - \sqrt{2} \text{ m/sec}$

speed $(u) = \sqrt{2} \text{ m/sec}$

$a(\frac{\pi}{4}) = \sqrt{2} \text{ m/sec}^2$

Jerk = $\sqrt{2} \text{ m/sec}^3$

(34) $s = \sin t + \cos t$

a) $v(t) = \cos t + (-\sin t)$

$v(t) = \cos t - \sin t \text{ m/sec}$

speed = $|\cos t - \sin t| \text{ m/sec}$

$a(t) = -\sin t - \cos t \text{ m/sec}^2$

Jerk = $-\cos t + \sin t \text{ m/sec}^3$

b) $v(\frac{\pi}{4}) = 0 \text{ m/sec}$

speed = 0 m/sec

$a(t) = -\sqrt{2} \text{ m/sec}^2$

Jerk = 0 m/sec^3

(35) $y = \csc x$

$y' = -\csc x \cot x$

$y'' = -(-\csc x \cot x) \cot x + (-\csc x)(-\csc^2 x)$

$y'' = \csc x \cot^2 x + \csc^3 x$

(36) $y = \theta \tan \theta$

$y' = 1(\tan \theta) + \theta \sec^2 \theta$

$y'' = \sec^2 \theta + 1 \sec^2 \theta + \theta \cdot 2 \sec \theta \cdot \sec \theta \tan \theta$

$y'' = 2 \sec^2 \theta + 2 \theta \sec^2 \theta \tan \theta$

(37) $g(x) = \begin{cases} x+b, & x < 0 \\ \cos x, & x \geq 0 \end{cases}$

continuous @ $b=1$

$\lim_{x \rightarrow 0^-} (x+1) \text{ from left} = 1$

$\lim_{x \rightarrow 0^+} \cos x \text{ from right} = 1$

Not differentiable because

left $g'(x) = 1$

right $g'(x) = -\sin x = 0$

Not equal